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| 10/615,786  | 07/10/2003  | Shinichi Nonaka      | 500.42923X00        | 1501             |
| 20457   | 7590        | 11/03/2006           | EXAMINER            |                  |
| ANTONELLI, TERRY, STOUT & KRAUS, LLP<br>1300 NORTH SEVENTEENTH STREET<br>SUITE 1800<br>ARLINGTON, VA 22209-3873 |             |                      | SELBY, GEVELL V     |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2622                |                  |

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/615,786

Applicant(s)

NONAKA ET AL.

Examiner

Gevell Selby

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9 and 12-14 is/are rejected.
- 7) ☒ Claim(s) 5, 10 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-3, 6-9, 12, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukui, US 5,917,546.**

In regard to claim 1, Fukui, US 5,917,546, discloses an image pick-up device comprising:

an image sensor (see figure 2, element 1) having a plurality of photodiodes arranged in a grid to store the charge by photoelectric conversion of the incident light (see column 3, lines 19-24);

a driving means (see figure 2, element 16) to drive said image sensor in such a manner as to read at least two imaging signals having different exposure time by differentiating the timing of reading said charge of said photodiodes in according with a corresponding line (see column 3, lines 25-30 and column 4, lines 38-45); and

a signal processing means (see figure 2, elements 7 and 11) to generate an image signal by synthesizing and processing at least two imaging signals having different exposure time (see column 4, lines 25-36).

In regard to claim 2, Fukui, US 5,917,546, discloses the image pick-up device according to claim 1, wherein said driving means drives said image sensor in such a manner as to read two imaging signals having different exposure time by differentiating the read timing between the odd lines and the even lines of said photodiodes (see column 4, line 62 to column 5, lines 15).

In regard to claim 3, Fukui, US 5,917,546, discloses the image pick-up device according to claim 1, wherein said driving means drives said image sensor in such a manner as to read a long-time exposed imaging signal having a long exposure time and a short-time exposed imaging signal having a short exposure time from said image sensor (see column 4, line 62 to column 5, lines 15), and wherein said signal processing means generates an image signal by synthesizing and processing a signal representing the low-brightness portion of said long-time exposed imaging signal and a signal representing the high-brightness portion of said short-time exposed imaging signal (see column 5, lines 25-35).

In regard to claim 6, Fukui, US 5,917,546, discloses the image pick-up device according to claim 2, wherein said signal processing means corrects the deviation of the coordinates between an odd line and an even line when synthesizing said odd line and said even line (see column 5, lines 17-35:  $SIG_2$  is delayed and becomes  $SIG_2'$ , which is synthesized with  $SIG_1$ ).

In regard to claim 7, Fukui, US 5,917,546, discloses an imaging method comprising the steps of:

reading a long-time exposed imaging signal having a long exposure time from the odd lines (or the even lines) of an image sensor (see column 5, lines 9-16);

reading a short-time exposed imaging signal having a short exposure time from the even lines (or the odd lines) of said image sensor (see column 4, line 59 to column 5, line 8); and

generating an image signal by synthesizing and processing a signal representing the low-brightness portion of said long-time exposed imaging signal and a signal representing the high-brightness portion of said short-time exposed imaging signal (see column 5, lines 17-35).

In regard to claim 8, Fukui, US 5,917,546, discloses an image pick-up device comprising:

an imaging sensor means (see figure 2, element 1) to convert light into electrical energy, an image sensor driving means for driving said image sensor means (see column 3, lines 19-24),

it is inherent the Fukui reference comprises an A/D conversion means to sample the imaging signal read from said image sensor means and converting said imaging signal into a digital imaging signal, in order for digital image data to be processed by the DSP, and

a digital signal processing means (see figure 14, element 55) to generate a digital image signal by extracting the information on the color and the brightness from said digital imaging signal (see column 7, lines 18-29);

wherein said image sensor means has the number of effective pixels in vertical direction at least twice as many as the number of effective lines of the digital image signal output from said image pick-up device, said image sensor means changing the exposure time in vertical direction (see column 3, lines 19-40: the number of effective pixel is twice as many of the number of effective line output because the image sensor has enough line to capture two images while only one combined image is output); and

wherein said digital signal processing means distributes the imaging signals read from said image sensor means into groups of imaging signals obtained with the same exposure time, and thus generates a digital image signal representing at least two digital images, while at the same time adding said digital image signals to each other (see column 7, lines 18-30).

In regard to claim 9, Fukui, US 5,917,546, discloses the image pick-up device according to claim 8, wherein said image sensor means is a CCD image sensor means (see figure 2, element 1) including a photodiode means (see figure 3, element 2a and 2b) to convert light into electrical energy and store the electrical energy as charge, a vertical CCD means (see figure 3, elements 3) to vertically transfer the charge read from said photodiode means, a horizontal CCD means (See figure 3, element 4 and 5) to horizontally transfer the charge transferred thereto from said vertical CCD means, and it

is inherent that each horizontal CCD of the Fukui reference has an output amplifier means to convert the current change generated by the movement of the charge transferred from said horizontal CCD means, into a voltage charge, in order to be output to the CDS circuits.

In regard to claim 12, Fukui, US 5,917,546, discloses the image pick-up device according to claim 8, wherein said CCD image sensor means includes two lines of horizontal CCDs to acquire two imaging signals including an imaging signal having a long exposure time and an imaging signal having a short exposure time at the same time in one horizontal transfer period (see column 3, line 50 to column 4, line 5), wherein two systems of said digital signal processing means are provided to generate digital image signals representing the brightness information and the color difference information, and wherein after processing said two imaging signals are processed in parallel, two image signals are added to each other thereby to generate a new digital image signal including two digital image signals having different exposure time superposed one on the other (see column 7, lines 18-29).

In regard to claim 14, Fukui, US 5,917,546, discloses an image pick-up device comprising:

an image sensor means (see figure 2, element 1) to convert light into electrical energy, an image sensor driving means to drive said image sensor means (see column 3, lines 19-24),

it is inherent the Fukui reference comprises an A/D conversion means to sample the imaging signal read from said image sensor means and converting said

imaging signal into a digital imaging signal, in order for digital image data to be processed by the DSP,

a field memory means (see figure 14, elements 53a and 53b) to store a field of said digital imaging signal, and

a digital signal processing means (see figure 14, element 55) to generate a digital image signal by extracting the color and brightness information from said digital imaging signal (see column 7, lines 18-29),

wherein said image sensor means has effective vertical pixels at least twice as many as the effective lines of the digital image signal output by said image pick-up device (see column 3, lines 19-40: the number of effective pixel is twice as many of the number of effective line output because the image sensor has enough line to capture two images while only one combined image is output),

the exposure time of said image sensor means is switched in vertical direction thereby to carry out the imaging operation with the exposure time of less than one field and the imaging operation with the exposure time of not less than one field, in parallel to each other (see column 4, line 59 to column 5, line 16),

said digital signal processing means operating in such a manner that the imaging signal read from said image sensor means is distributed into groups of image signals obtained with the same exposure time thereby to generate digital image signals representing at least two digital images (see column 7, lines 18-29), and



those of said digital images which are obtained with the exposure time of not less than one field are stored in said field memory thereby to prepare and add an image signal having the exposure time of less than one field and an image signal having the exposure time of not less than one field to each other (see column 7, lines 18-29).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui, US 5,917,546 in view of Yadid-Pecht et al., US 6,115,065.**

In regard to claim 4, Fukui, US 5,917,546, discloses the image pick-up device according to claim 1. The Fukui reference does not disclose wherein said driving means drives said image sensor in such a manner as to read at least two imaging signals having different exposure time within one field period.

Yadid-Pecht et al., US 6,115,065, discloses an APS device that increases dynamic range by achieving one than one integration time for each pixel and having two horizontal readouts (206 and 204) that read out simultaneously lines of pixel with different integration times within one field period (see abstract and column 5, lines 18-50).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Fukui, US 5,917,546 in view of Yadid-Pecht et al., US 6,115,065, to have the APS device, wherein said driving means drives said image sensor in such a manner as to read at least two imaging signals having different exposure time within one field period, in order to increase the readout speed and increasing the dynamic range, thus providing a faster higher quality device.

In regard to claim 13, Fukui, US 5,917,546, discloses the image pick-up device according to claim 8,. The Fukui reference does not disclose wherein said image sensor means is a C-MOS image sensor means including a photodiode means to store the electrical energy as a charge converted from light by said image sensor means, a temporary charge storage means associated with said photodiodes arranged in grid form to temporarily store the charge read from said photodiodes, a charge read gate interposed between said temporary charge storage means and an output amplifier, and a gate driving means to control the operation of said charge read gate and the read timing of the charge to said charge read gate, and wherein the read timing of the charge to said charge read gate is switched in vertical direction thereby to generate at least two images having different exposure time.

Yadid-Pecht et al., US 6,115,065, discloses an APS device wherein said image sensor means is a C-MOS image sensor means (see figure 2, element 202) including a photodiode means to store the electrical energy as a charge converted from light by said image sensor means (see column 4, lines 36-47), a temporary charge storage means (see active transistors) associated with said photodiodes arranged in grid form to temporarily

store the charge read from said photodiodes (see column 4, lines 36-47), a charge read gate (see figure 2, element 204 and 206) interposed between said temporary charge storage means and an output amplifier, and a gate driving means (control circuit) to control the operation of said charge read gate and the read timing of the charge to said charge read gate (see column 4, lines 59-65), and wherein the read timing of the charge to said charge read gate is switched in vertical direction thereby to generate at least two images having different exposure time (see column 5, lines 18-50).

It would have been obvious to one of ordinary skill in the art at the time of invention to have been motivated to modify Fukui, US 5,917,546 in view of Yadid-Pecht et al., US 6,115,065, to have the CMOS image sensor as described in regard to claim 13, in order to increase the readout speed and increasing the dynamic range, thus providing a faster higher quality device.

#### *Allowable Subject Matter*

6. Claims 5, 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,278,490, discloses an image pickup apparatus that combined a long exposure image and a short exposure image.

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US 7,050,094, discloses an APS device with a wide dynamic range/

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gevell Selby whose telephone number is 571-272-7369. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivek Srivastava can be reached on 571-272-7304. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

gvs



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